CLAIM LISTING

1. (currently amended) A method for assigning a pilot sequence to communication units within a communication system, the method comprising the steps of:

assigning a first communication unit a first pilot sequence for transmission on a portion of a communication resource, wherein the first pilot sequence is selected from a group of pilot sequences constructed from a set of Generalized Chirp-Like (GCL) sequences; and

assigning a second communication unit a second pilot sequence for transmission on at least the portion of the communication resource, the second pilot sequence taken from the group of pilot sequences constructed from the set of GCL sequences.

2. (original) The method of claim 1 wherein the step of assigning the first communication unit the first pilot sequence comprises the step of assigning a first base unit the first pilot sequence, and wherein the step of assigning the second communication unit the second pilot sequence comprises the step of assigning a second base unit the second pilot sequence.

3. (original) The method of claim 1 wherein the step of assigning the first communication unit the first pilot sequence comprises the step of assigning a first remote unit the first pilot sequence, and wherein the step of assigning the second communication unit the second pilot sequence comprises the step of assigning a second remote unit the second pilot sequence.

4. (original) The method of claim 1 wherein the step of assigning the first communication unit the first pilot sequence comprises the step of assigning a first sector of a base station the first pilot sequence, and wherein the step of assigning the second communication unit the second pilot sequence comprises the step of assigning a second sector of the base station the second pilot sequence.

5. (original) The method of claim 1 wherein the step of assigning the first communication unit the first pilot sequence comprises the step of assigning a first antenna of a sector of the base station the first pilot sequence, and wherein the step of assigning the second communication unit the second pilot sequence comprises the step of assigning a second antenna of a sector of the base station the second pilot sequence.

6. (original) The method of claim 1 wherein prior to assigning the first and the second communication units the first and the second pilot sequences, performing the step of determining

a length of the pilot sequences (N_G) based on a number of pilot sequences needed in the communication system (K) and a desired pilot sequence length (N_p).

7. (original) The method of claim 6 further comprising the step of:

choosing N_G to be equal to N_p if the smallest prime factor of N_p excluding "1" is larger than K.

8. (original) The method of claim 6 further comprising the step of:

choosing N_G to be a smallest integer that is greater than N_p and whose minimum prime factor excluding "1" is larger than K and generating the set of GCL sequences by truncating sequences in the set to N_p; or

choosing N_G to be a largest integer that is smaller than N_p and whose minimum prime factor excluding "1" is larger than K, and generating the set of GCL sequences set by repeating beginning elements of each sequence in the set to append at an end of each sequence to reach the desired length N_p.

9. (original) The method of claim 1 wherein the first and the second pilot sequences are constructed from the GCL sequences or from sequences resulting from taking a size- N_G unitary transformation of the GCL sequences; and the GCL sequences are generated as

$$S_u = (a_u(0)b, a_u(1)b, \ldots, a_u(N_G\text{-}1)b),$$

where b is any complex scalar of unit amplitude and

$$a_u(k) = \exp(-j2\pi u \frac{k(k+1)/2 + qk}{N_G}),$$

where,

$u=1, \ldots N_G$-1 is known as the "class" of the GCL sequence
$k=0, 1, \ldots N_G$-1
q=*any integer.*

10. (previously presented) The method of claim 9 wherein the step of assigning the first communication unit the first pilot sequence comprises the step of assigning the first communication unit a pilot sequence constructed from the class-u_1 GCL sequence; and

wherein the step of assigning the second communication unit the second pilot sequence comprises the step of assigning the second communication unit a pilot sequence constructed from the class-u_2 GCL sequence that satisfies the requirement of $|u_1-u_2|$ being relatively prime to N_G.

11. (currently amended) A method comprising the steps of:

receiving a pilot sequence as part of an ~~over-the-air~~ over-the-air transmission, wherein the pilot sequence is constructed from a set of Generalized Chirp-Like (GCL) sequences and is ~~uniquely~~ assigned to either a base unit or a remote unit, wherein the pilot sequence is based on a truncated GCL sequence or a cyclically extended GCL sequence; and

utilizing the pilot sequence for at least one of the following:

acquisition and tracking of timing and frequency synchronization, estimation and tracking of desired channels for subsequent demodulation and decoding, estimation and monitoring of characteristics of other channels for handoff purposes, and interference suppression.

12. (original) The method of claim 11 wherein the step of receiving the pilot sequence comprises the step of receiving the pilot sequence at a base unit.

13. (original) The method of claim 11 wherein the step of receiving the pilot sequence comprises the step of receiving the pilot sequence at a remote unit.

14. (currently amended) The method of claim 11 wherein the step of receiving the pilot sequence comprises the step of receiving a pilot sequence ~~sequences~~ constructed from GCL sequences or from sequences resulting from taking a size- N_G unitary transformation of the GCL sequences, and the GCL sequences are generated as

$$S_u = (a_u(0)b, a_u(1)b, \ldots, a_u(N_G\text{-}1)b),$$

where b is any complex scalar of unit amplitude and

$$a_u(k) = \exp(-j2\pi u \frac{k(k+1)/2+qk}{N_G}),$$

where,

$u=1, \ldots N_G-1$ is known as the "class" of the GCL sequence
$k=0, 1, \ldots N_G-1$
$q=$*any integer.*

15. (currently amended) A communication unit comprising:

pilot channel circuitry for transmitting or receiving a pilot channel sequence via a portion of a communication resource,

wherein the pilot channel sequence comprises a sequence ~~uniquely assigned to the communication unit and is constructed from a GCL sequence~~ from a group of pilot sequences constructed from a set of Generalized Chirp-Like (GCL) sequences and

wherein at least the portion of the communication resource is utilized for the transmission or reception of a second pilot channel sequence taken from the group of pilot sequences constructed from the set of GCL sequences.

16. (original) The communication unit of claim 15 wherein the GCL sequence is equal to

$$S_u = (a_u(0)b, a_u(1)b, \ldots, a_u(N_G-1)b),$$

where b is a complex scalar of unit amplitude and

$$a_u(k) = \exp(-j2\pi u \frac{k(k+1)/2+qk}{N_G}),$$

where,

$u=1, \ldots N_G-1$ is the "class" of the GCL sequence
$k=0, 1, \ldots N_G-1$
$q=$*any integer.*

17. (original) The communication unit of claim 15 further comprising:

data channel circuitry for transmitting data, wherein a peak to average power ratio (PAPR) of the pilot channel sequence is lower than a PAPR of data transmitted over the data channel circuitry.

18. (original) The communication unit of claim 17 wherein the pilot channel sequence is transmitted at a higher power than the data.

19. (new) The method of claim 1 wherein the communication resource is a set of subcarriers.

20. (new) The method of claim 1 wherein the first pilot sequence is constructed from a Generalized Chirp-Like (GCL) sequence of a first class and the second pilot sequence is constructed from a Generalized Chirp-Like (GCL) sequence of a second class.

21. (new) The method of claim 1 wherein the second pilot sequence is based on a function of the first sequence and wherein the function of the first sequence is based on at least one of

circular shifting of the first sequence and

rotating the phase of elements of the first sequence.

22. (new) The method of claim 21 wherein the first and second communication units each comprise an antenna of a base unit or each comprise an antenna of a remote unit.

23. (new) The method of claim 1

wherein assigning the first communication unit the first pilot sequence comprises

assigning a first antenna of a remote unit the first pilot sequence, and

wherein assigning the second communication unit the second pilot sequence comprises

assigning a second antenna of the remote unit the second pilot sequence.

24. (new) The method of claim 1 wherein the first pilot sequence is based on a truncated Generalized Chirp-Like (GCL) sequence.

25. (new) The method of claim 1 wherein the first pilot sequence is of length N_p, and is based on a truncation of a length N_G Generalized Chirp-Like (GCL) sequence, wherein N_G is the smallest prime number that is larger than N_p.

26. (new) The method of claim 1 wherein the first pilot sequence is based on a cyclically extended Generalized Chirp-Like (GCL) sequence.

27. (new) The method of claim 1 wherein the first pilot sequence is of length N_p, and is based on an extension of a length N_G Generalized Chirp-Like (GCL) sequence,

wherein N_G is the largest prime number that is smaller than N_p and the extension is based on appending a repetition of the beginning elements of the GCL sequence to the end to reach the length N_p.

28. (new) The method of claim 1 wherein the first pilot sequence is assigned to a set of subcarriers in the frequency domain.

29. (new) The method of claim 1 further comprising utilizing by the first communication unit different sequences for transmission at different times in a transmission frame.

30. (new) The method of claim 1 wherein assigning the first communication unit the first pilot sequence comprises assigning the first communication unit a pilot sequence constructed from a class-u_1 GCL sequence and

wherein assigning the second communication unit the second pilot sequence comprises assigning the second communication unit a pilot sequence constructed from a class-u_2 GCL sequence that satisfies the requirement of $|u_1-u_2|$ being relatively prime to N_G., where N_G is a length of the GCL sequence from which the first pilot sequence is constructed.